AN

ESSAY

TOWARDS MAKING THE

DOCTRINE

OF

CHANCES

EASY to thoſe who underſtand VULGAR ARITHMETICK only.

To which are added,

Some Uſeful TABLES on ANNUITIES for LIVES, &c. &c. &c.

By Mr. *HOYLE.*

A New EDITION Corrected.

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No Copies of this Book are genuine, but thoſe that are ſigned by the Proprietors on the Back of this Title.

Tho: Osborne

Baldwin

TO THE

RIGHT HONOURABLE

THE

EARL of EGMONT.

MY LORD,

THIS Treatiſe on the DOCTRINE of CHANCES, is moſt humbly inſcribed to your Lordſhip, in

Acknowledgment of the many Favours conferred upon,

Your Lordſhip's

Humble, and moſt

Obedient Servant,

EDMOND HOYLE.

THE

PREFACE.

IN order to put Play upon the moſt equal Foot, in this Treatiſe you have practical Rules and Examples, plainly expreſſed in Words at Length, whereby all various Caſes, and the Odds of Games

Games of any Kind, may be eaſily reſolved, without any Knowledge of Algebra or Logarithms; by which the moſt unſkilful Perſon in betting his Money, is put upon an equal Foot with thoſe who have applied themſelves to this Kind of Study for many Years.

Calculations at Whiſt, when you are one Game love, and any certain Number of Points in the ſecond Game, how to bet your Money upon an Equality; alſo Directions for calculating the Chances at Whiſt.

Calculations at All-Fours, which ſhews you the Odds when you

you ought to beg, or give a Point to your Adverſary when he begs, with Directions how to calculate the Chances at that Game.

Tables of Annuities upon Lives, calculated according to the *London* Bills of Mortality, and *Breſlaw* Tables; with ſeveral other uſeful Tables, which the Reader may underſtand without any Knowledge of Decimals.

Calculations for Lotteries and Dice, with Directions how to perform the Operations.

A ſhort Table of the Powers of two, ſhewing the Odds of winning or loſing any Number of Games upon an Equality of Chance.

CHAP.

AN

ESSAY

ON THE

Doctrine of Chances, &c.

CHAP. I.

COMBINATIONS,

ARE the various Conjunctions which several Things may receive without any Regard to Order, being taken 2 and 2, 3 and 3, &c.

The RULE.

First, You are to multiply continually, beginning with Unit (or 1) as many of the least of those Numbers as your Combinations are to be of, and

 the

the Product of that Multiplication is to be the Divisor..

Then multiply after the same Manner exactly, as many of the last or greatest of those Numbers as your Combinations are to be of, for a Dividend; then divide that last Product by the first, which solves the Question.

EXAMPLE I.

Quere, How many different Combinations of Three may be had in Six Figures, *viz.* 1, 2, 3, 4, 5, 6.

Thus, 6
5
———
30
4
———
120 The Three highest Numbers multiplied into one another for your Dividend.

Thus,

Thus, 1
2
—
2
3
—
6 The Three lowest Numbers multiplied into one another for your Divisor.

	Dividend.	
Divisor 6	120	20 different Combinations may be had of 3 in 6 Figures.
	12	

You see the Dividend being 120, is the Product of the 3 highest Numbers multiplied into one another, which Product is to be divided by 6, being the 3 lowest Numbers multiplied into one another, which make 20, and shews that the Combinations of 3 in 6 Figures make 20.

Quere, How many Combinations may be had of 4 Cards in 7 Cards?

You are, as in the former Caſe, to multiply the Four higheſt Numbers together for a Dividend, then you are to multiply the Four loweſt Numbers together for a Diviſor, and proceed as in the former Example.

Example II.

Thus,

$$\begin{array}{r} 7 \\ 6 \\ \hline 42 \\ 5 \\ \hline 210 \\ 4 \\ \hline 840 \end{array}$$

840 Total of high Numbers for a Dividend.

Thus,

Thus, 1
2

2
3

6
4
---
24 Total of low Numbers for a Divisor.

Dividend.

Divisor 24 | 840 | 35 different Combinations may be had of 4 Cards in Seven.
72

120
120

Thus any Question of the like Nature may be solved.

A short TABLE *which saves some Trouble in these Kinds of Calculations.*

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2		1	3	6	10	15	21	28	36	45
3			1	4	10	20	35	56	84	120
4				1	5	15	35	70	126	210
5					1	6	21	56	126	252
6						1	7	28	84	210
7							1	8	36	120
8								1	9	45
9									1	10
10										1

An Explanation of the Table.

Suppose you are to find out how many different Combinations there are of Four in Seven, look for Four in the Perpendicular, and carry your Finger along that Line till you come under 7, where you will find 35 the Answer.

Thus

Thus you may proceed for any other Cafe within the Limits of the Table.

The Powers of Two, or a Table to find out the Odds of lofing any Number of Games, upon an Equality of Chance within the Limits of the Table.

Thus,	1	2
	2	4
	3	8
	4	16
	5	32
	6	64
	7	128
	8	256
	9	512
	10	1,024
	11	2,048
	12	4,096
	13	8,192
	14	16,384
	15	32,768
	16	65,536

An

An Explanation of the Table.

Suppoſe you require to know the Odds of loſing Three Games together, look in the Table for 3, and againſt it you will find 8, therefore by ſubſtracting 1 out of 8 there remains 7; which is the Odds of not loſing Three Games together, *viz.* 7 to 1.

The like Method may be taken for any other Caſe.

CHAP. II.

PICQUET.

WHAT Chance has the younger Hand, to take in Three certain Cards: How is this Caſe to be ſolved?

You are to multiply the Three higheſt Numbers into one another for your

Dividend; then multiply the Three lowest Numbers into one another for your Divisor, there being 20 Cards unseen.

EXAMPLE I.

Thus,

$$\begin{array}{r} 19 \\ 20 \\ \hline 380 \\ 18 \\ \hline 3040 \\ 380 \\ \hline 6840 \end{array}$$

6840 The 3 highest Numbers.

Thus,

$$\begin{array}{r} 1 \\ 2 \\ \hline 2 \\ 3 \\ \hline 6 \end{array}$$

6 The 3 lowest Numbers.

Dividend.

Divisor 6 | 6840 | 1140
| 6 . . . |

8
6

24
24

Quere, What Chance has the younger Hand to take in an Ace, having none dealt him ?

The Number of Cards in which the 4 Aces are contained being 20, and therefore the Number of Cards, out of which the 4 Aces are excluded, being 16 ; it follows, that the Number of Chances which there are for taking Three Cards, amongst which no Ace shall be found, is the Number of Combinations which 16 Cards may afford, being taken 3 and 3 ; which Combinations are thus found.

You

You are to multiply 16 by 15, that Product by 14, which make 3360, being the whole Number of Chances of the Three higheſt Numbers, for a Dividend; then you are to multiply into one another, the Three loweſt Numbers for a Diviſor.

EXAMPLE II.

Thus,

$$\begin{array}{r} 16 \\ 15 \\ \hline 80 \\ 16 \\ \hline 240 \\ 14 \\ \hline 960 \\ 240 \\ \hline 3360 \end{array}$$

3360 The 3 higheſt Numbers for a Dividend.

 Thus,

Thus,

$$\begin{array}{r} 1 \\ 2 \\ \hline 2 \\ 3 \\ \hline 6 \end{array}$$

The 3 loweſt Numbers for a Diviſor.

Dividend,

$$\text{Diviſor} \quad 6 \left| \begin{array}{l} 3360 \\ 30.. \\ \hline 36 \\ 36 \end{array} \right| 560$$

Now all the Number of Chances as found in the preceding Caſe, being 1140; from whence it follows that the Probability of not taking an Ace in Three Cards, is $\frac{560}{1140}$, or 560 to be ſubſtracted from 1140, which ſolves the Queſtion.

$$\begin{array}{lr} \text{Thus,} & 1140 \\ \text{Subſtract} & 560 \\ \hline & 580 \end{array}$$

for taking in an Ace, and

and 560 againſt it. Which when reduced, will be found to be 29 for taking in an Ace in 3 Cards, againſt 28 for not doing it.

CHAP. III.

LET us ſuppoſe a Pack of Cards containing 36, to be equally divided between *A* and *B*.

Quere, What is *A*'s Chance for having Four certain Cards (or Four Aces) in his Eighteen Cards dealt him?

You are to multiply the Four higheſt Numbers together, in order to find out the whole Number of Chances, which make 1,413,720.

Then you are to multiply the Four higheſt Numbers of *A*'s 18 Cards, which make 73,440 for a Diviſor; after

after you have divided the whole Number by *A*'s Chances, that Product solves the Question.

Thus the whole Number of Chances, *viz.* 1,413,720, are to be divided by *A*'s Chance, *viz.* 73,440, which solves the Question.

Example I.

	The Whole.	
A's Chance, 73,440	1,413,720	19,25
	73440.	1, Subst. for *A*.
	679320	18,25 against *A*.
	660960	
	183600	
	146880	
	367200	
	367200	

Thus you may see that it is 18 nearly to 1, against *A*'s having any Four certain Cards dealt him.

Ex-

Example II.

Let us try whether the foregoing Case, as solved, will exactly agree with our former Directions.

Which is to multiply in the following Order, *viz.* 18 by 17, that Product by 16, and that Product by 15, which make, as in the preceding Case, 73,440 for *A*, which is to be divided by the Four lowest Numbers, multiplied into one another, *viz.* 1, 2, 3, 4, they make 24.

Thus, 24 | 73,440 | 3060 for *A*.
  72 . . .
  144
  144

Then you are to multiply, as in the preceding Case, 36 by 35, that Product by 34, and that Product by 33, being 1,413,720 the whole Number of

of Chances, which are to be divided by the Four loweſt Numbers, *viz.* 1, 2, 3, 4, multiplied into one another, which make 24 for a Diviſor.

```
Thus,  24 | 1,413,720 | 58,905
          | 120 . . . |
            ---
            213
            192
            ----
             217
             216
            -----
               120
               120
```

Now in order to find out the exact Odds, you are to divide the foregoing Number 58,905 by *A*'s Chance, *viz.* 3060, which Product ſolves the Queſtion.

Thus,

```
Thus, 3060 | 58,905 | 19,25
           | 3060 . |  1,
             ------   -----
             28305     18,25 againſt A.
             27540
             ------
              7650
              6120 .
             ------
             15300
             15300
```

CHAP. IV.

ALL-FOURS.

CASES calculated, in order to ſhew the Player the Odds, for and againſt him, to beg, or not to beg.

First Quere, What is the Chance that *A* holds One Trump or more in his Six Cards dealt him?

Answer, It is nearly Nine to Two for him.

Second, What is the Chance that *A* holds any One out of Two certain Cards; *viz.* Ace, or King of Trumps?

Answer, It is nearly Three to One against him.

Third, What is the Chance that *A* holds any One out of Three certain Cards; *viz.* Ace, King, or Queen of Trumps?

Answer, It is nearly Nine to Five against him.

Fourth, What is the Chance that *A* holds any One out of Four certain Cards; *viz.* Ace, King, Queen, or Knave of Trumps?

Answer, It is nearly Eleven to Nine against him.

Fifth,

Fifth, What is the Chance that *A* holds any One of Five certain Chards; *viz.* Ace, King, Queen, Knave, or Ten of Trumps?

Answer, It is nearly Twenty-eight for him, to Twenty-five against him.

Sixth, What is the Chance that *A* holds any One of Six certain Cards; *viz.* Ace, King, Queen, Knave, Ten, or Nine of Trumps?

Answer, It is nearly Three for him, to Two against him.

Seventh, What is the Chance that *A* holds any One of Seven certain Cards; *viz.* Ace, King, Queen, Knave, Ten, Nine, or Eight of Trumps?

Answer, It is nearly Thirty-nine for him, to Twenty against him.

Quere, In how many Deals am I entitled to turn up Jack?

Anſwer, It is nearly an equal Wager that you turn up Jack once in Eight Deals: Thus, there being Four Jacks in a Pack of Fifty-two Cards, conſequently there is One Jack in Thirteen Cards; therefore multiply 12 by 0,7, which ſolves the Queſtion.

Thus, 12
0,7
———
According to Mr. *Demoivre*'s 8,4
Doctrine.

Quere, *Firſt*, What Chance that *A* holds, either Ace or King of Trumps?

Forty-five Cards being the Number, you are to multiply 45 by 44, which is 1980 for the whole Number of Chances.

The

The whole Number of Chances,	1980
A's Chance to hold One or the other, that he holds *A* and not *B*, multiply 39 by 6, which gives - - - -	234
That he holds *B* and not *A*, multiply as before - -	234
From the whole Number ſubſtr.	468
Remainder againſt him	1512

Therefore it is nearly Three to One, that he holds neither Ace nor King of Trumps.

CHAP. V.

CALCULATIONS at Whiſt, to ſhew the Odds upon winning the Firſt Game of the Rubber, and alſo any Point of the Second Game.

Suppoſe

Suppofe Elder Hand.	for, agft.
Firft Game, and 9 love of the Second Game, - - -	11 to 1
Firft Game, and 8 love of the Second, is nearly - -	11 to 1
Firft Game, and 7 love of the Second, is - - -	9 to 1
Firft Game, and 6 love of the Second, - - -	7 to 1
Firft Game, and 5 love of the Second - - -	5 to 1
Firft Game, and 4 love of the Second, - - -	$4\frac{1}{2}$ to 1
Firft Game, and 3 love of the Second, - - -	4 to 1
Firft Game, and 2 love of the Second, - - -	7 to 2
Firft Game, and 1 love of the Second, - - -	$6\frac{1}{4}$ to 1

The Ufe which may be made of the foregoing Table.

Suppofe *A* and his Partner are One Game of the Rubber, and 9 love of the

the Second Game, and 12 Pounds depending, it is plain that *A* and his Partner are intitled to receive Eleven Pounds of the Stake depending, and Adverſaries One Pound only.

The like Method (in Caſe of dividing the Stakes) may be taken in any other Score of the Game.

Let us ſuppoſe that 9 love with the Deal, is nearly 6 to 1.

With the Deal.	for, agſt.
Firſt Game, and 9 love of the Second Game, is nearly	13 to 1
Firſt Game, and 8 love of the Second, is nearly 3 and $\frac{1}{2}$ *per Cent.* more than the former.	
Firſt Game, and 7 love of the Second, is - - -	10 to 1
Firſt Game, and 6 love of the Second, - - -	8 to 1
Firſt Game, and 5 love of the Second, - - -	6 to 1

Firſt

First Game, and 4 love of the Second, - - -	5 to 1
First Game, and 3 love of the Second, - - -	$4\frac{1}{2}$ to 1
First Game, and 2 love of the Second, - - -	4 to 1
First Game, and 1 love of the Second, - - -	7 to 2

Calculations at Whist.

Variations. The Two Letters (or Cards) *A*, *B*, or 1, 2, may be placed Two different Ways, *viz.* *A*, *B*, or *B*, *A*, or 1, 2, or 2, 1.

A Third Letter *C* may be placed before them, between them, or after them; that is, Three Ways.

These 3 multiplied by 2 make 6; that is to say, by the different Positions of *A*, *B*, *C*, are all the different Ways that Three Letters, or Numbers, can be ranged in a different Order.

And if a Fourth Letter *D* be introduced, multiply the Variations of Three as already by Four, and ſo on to the End of new Numbers.

Hence, Firſt Rule, multiply the Number of Letters, or Figures, whoſe Variations or Chances are ſought, into the inferior Numbers, down to Unity or One.

How many different Ways can I range Five Letters or Figures.

To find the Numbers, you are to multiply them in the following Order, *viz.* you are to multiply 5 by 4, which makes 20; that Product is to be multiplied by 3, which makes 60; and that Product is to be multiplied by 2, which makes 120; which ſolves the Queſtion.

Second Combination, or Election, if out of any Number of Cards, I am to

chuſe any 2, any 3, *&c.* how many Ways may I vary my Choice?

Suppoſe the Number of Cards to be Thirteen, and that I may chuſe Two of them; Firſt, I may chuſe any one of the Thirteen, then I may chuſe any one of the remaining Twelve.

And if I am to chuſe Three Cards, I may chuſe One out of the remaining Eleven; therefore to find out the Odds, you are to multiply the Two higheſt Numbers together, which are 13 by 12, they make 156, and are all the various Ways of chuſing Two in the Firſt Caſe; and 13 multiplied by 12, and that Product multiplied by 11, which make 1716, being all the Varieties of Choice of Three Cards in the Second Caſe.

But we muſt conſider, that when we chuſe Two Cards, whether I take *A* firſt, and then *B*, or *B* firſt, and then *A*,

A, I ſtill chuſe the ſame Letters; it is plain, that I muſt divide 156 by 2; that is, by the Variation of 2.

And when I chuſe 3 Cards, I muſt divide the Number 1716 by 6; that is to ſay, by the Variations of 3; ſince, however the Order in chuſing of them may be varied, they are ſtill the ſame Letters, and the Choice is the ſame.

Hence, Second RULE,

Multiply the Number of Cards (in this Caſe being 13) out of which I am to chuſe in the next inferior Number (12) and then into ſo many inferior Numbers gradually as you are to chuſe Cards.

Then divide the whole Product, by the Variations of the Cards you are to chuſe.

EXAMPLE.

I am to chuſe 2 Cards out of 13: How many different Couples may I form?

Anſwer, You are to multiply the Two higheſt Numbers together, being 13 and 12, which make 156, and then divide that Product by 2, which is the Variations of the 2 loweſt Numbers, *viz.* 1, 2; which Product makes 78, being the Anſwer to the Queſtion.

Or I am to chuſe 3 out of 13.

Therefore multiply 13 by 12, and that Product by 11, which makes 1716, and then divide that Product by 6, which is the Variation of the 3 loweſt Numbers, *viz.* 1, 2, 3; which Product makes 286, being the Anſwer to the Queſtion.

The 3 higheſt Numbers multiplied into one another.

```
              Dividend.
Diviſor  6 | 1716 | 286
           | 12.. |
            ----
             51
             48
            ----
             36
```

Or I am to chuſe 4 Cards out of 13.

Therefore multiply 13 by 12, that Product by 11, and that Product by 10, which make 17160, which Product is to be divided by the 4 loweſt Numbers multiplied into one another, *viz.* 1, 2, 3, 4.

The 4 higheſt Numbers as before, make - - -	17160
The 4 loweſt Numbers as before, make - - -	24

Di-

Dividend.

$$\begin{array}{r|l|l} \text{Divisor } 24 & 17160 & 715 \\ & 168.. & \\ \hline & 36 & \\ & 24 & \\ \hline & 120 & \\ & 120 & \end{array}$$

Therefore it is 714 to 1, that out of a Pack of Cards containing Thirteen, you do not draw Four certain Cards.

I would range a certain Number of Cards, in a certain Number of Places.

Third Rule.

Multiply the higher Numbers of the Places together, as in the Second Rule, but do not divide.

Ex-

EXAMPLE.

How many Ways can I range Two Cards in Thirteen Places ?

Anſwer, You are to multiply 13 by 12, which ſolves the Queſtion.

Thus, 13
12
———
156 Ways.

How many Ways can I range Four Cards in Thirteen Places.

Anſwer, You are to multiply the Four higheſt Numbers into one another; which ſolves the Queſtion.

Thus,

Thus,

```
     13
     12
   ----
    156
     11
   ----
    156
   156
   ----
   1716
     10
  -----
  17160 Ways.
```

N. B. I do not divide as in the Example to the Second Rule, becauſe I then ſought only how many different Choices I might make: Here I range my Cards differently, not only with regard to the different Places I put them into, but alſo to their Variations of Poſition amongſt themſelves.

Ap-

Application of theſe Rules at WHIST.

Firſt Quere, What is the Chance that my Partner holds Two certain Cards?

Suppoſe the Number of Cards in the 3 Hands to be 39: By the Third Rule, theſe Two Cards may lie in the Three Hands; thus: Multiply the Two higheſt Numbers together; *viz.* 39 by 38, which make all the Ways.

	Ways.
	1482
And by the ſame Rule, they may lie in my Partner's Hand; 13 multiplied by 12, which make 156 for my Partner's Chance, which is to be ſubſtracted from the Whole.	156
	1326

 Anſwer,

Answer, 1326 to 156, which when reduced is 17 to 2, that my Partner has not Two certain Cards.

Second Quere, That of the Two Cards, *A* and *B*, One only lies in my Partner's Hand, and that the Adversaries hold the other?

A in 1 of 13 Places
B in 1 of 26 Places

Multiply together } 78
26

338

B in 1 of 13 Places
A in 1 of 26 Places

Multiply together } 78
26

338

Third

Third Quere, That the Adverſaries hold *A* and *B*.

Total of Chances as before,	1482
By the 3d Rule, Two Cards in Twenty-ſix Places are 26 multiplied by 25, which make 650; theſe are to be ſubſtracted from the Whole. - - - -	650
Remainder	832

The Chance then is 832 to 650; or when reduced, is 32 to 25.

PROOF of the OPERATION.

	Chances.
That my Partner holds both Cards, is - - - - -	156
That he holds only *A*, is -	338
That he holds only *B*, is -	338
That the Adverſaries hold both, is - - - -	650
	1482

What is the Chance that my Partner holds Three certain Cards? Suppose the Number of Cards to be Thirty-nine in Three Hands.

To find the whole Number of Chances, you are to multiply the Three higheſt Numbers into one another, *viz.* 39 by 38, and that Product by 37; which make - - - 54804

And to find my Partner's Chance, you are to multiply the following Numbers into one another, *viz.* 13 by 12, and that Product by 11, which make 1716; which is to be ſubſtracted from the whole Number. - 1716

Remainder 53088

Therefore we find it is 53088 to 1716, that my Partner does not hold Three certain Cards.

When

When reduced, it is nearly 31 to 1 againſt my Partner.

Firſt Quere, What is the Chance that the Dealers at Whiſt have Four Honours?

Anſwer, Twenty-ſeven to Two againſt them.

Second, What is the Chance that the eldeſt Hands have Four Honours?

Anſwer, Twenty-three to One againſt them.

Third, What is the Chance that either Side have Four Honours?

Anſwer, Nearly Eight to One againſt them.

Fourth, What is the Chance that the Dealers have not Three Honours?

Anſwer,

Answer, Thirteen to Seven against them.

Fifth, What is the Chance that the eldest Hands have Three Honours?

Answer, Twenty to Seven nearly against them.

Supposing a Heap of Thirteen Clubs, also a Heap of Thirteen Spades.

Quere, What Chance that you take out of both Heaps the Two Aces, or any Two certain Cards.

Answer, Thus solved: The Probability of taking an Ace out of the First Heap is $\frac{1}{13}$ or 1 Chance out of 13, and so is the Probability of taking an Ace out of the Second Heap $\frac{1}{13}$, or 1 Chance out of 13; therefore to find out the exact Odds, you are to multiply $\frac{1}{13}$ by $\frac{1}{13}$, or multiply 13 by 13, and that Product solves the Question.

Thus,

Thus, 13
13
———
39
13
———
169 Chances in the Whole; therefore it is 168 to 1 againſt you.

Suppoſe out of a ſingle Heap of Thirteen Cards of One Colour, you ſhould undertake to take out the Ace, and then the Deuce; tho' the Probability of taking out the Ace be $\frac{1}{13}$, or 12 to 1, and the Probability of taking out the Deuce is alſo $\frac{1}{13}$, or 12 to 1; yet the Ace being ſuppoſed as taken out, there will remain only Twelve Cards in the Heap, which will make the Probability of taking out the Deuce to be $\frac{1}{12}$, or 11 to 1; therefore the Probability of taking out the Ace, and then the Deuce, will be $\frac{1}{12}$, multiplied by $\frac{1}{13}$, or multiply 13 by 12, which ſolves the Queſtion.

Upon

Upon this Way of Reasoning, the Doctrine of Combinations may be grounded.

Thus, 13
12
———
156 Chances in the Whole; therefore it is 155 to 1 against you.

CHAP. VI.

Variety of Questions on Games of Chance, with their Solutions.

A And *B* play at a Game of Chance, *A* has Five to Four in his Favour to win that Game.

Quere, First, What is the Chance that *A* loses Two Games together, having Five to Four of each Game.

The

The Method of finding out the whole Number of Chances is thus: Firſt, you are to add 5 and 4 together, which is the Odds of the Game, in favour of *A*; then you are to multiply that Product, which is 9, by 9, which makes 81; and that is the whole Number of Chances, out of which you are to ſubſtract *B*'s Chance, which is 4 to be multiplied by 4, which makes 16, and the Remainder being 65, is in favour of *A*, and 16 in favour of *B*.

Thus, Add, } 5 4

Multiply, } 9 9

The Whole.

81 is the whole Number of Chances, 81

B's Chance, Multiplied, } 4 4

16 *B*'s Chance to be ſubſtracted 16

In favour of *A*, 65
In favour of *B*, 16

The Whole 81

 There-

Therefore, the Odds in favour of *A* is Sixty-five to Sixteen in favour of *B*, or nearly Four to One.

Quere, Second, A has Seven to Four for winning the Game of *B*.

What is the Odds that he loses Two Games together, having Seven to Four of each Game?

Thus, Add,	7 4		
Multiply,	11 11		
			The Whole.
	121	The whole Number of Chances	121
B's Chance, Multiply,	4 4		
	16	*B*'s Chance is to be subst.	16
		In favour of *A*,	105
		In favour of *B*,	16
		The Whole	121

When reduced it is Six and a half to One nearly.

Quere,

Quere, Third, What is the Odds of losing Three to Two, twice together?

	Add		
	3		
	2		
Multiply	5		
	5		The Whole.
	25	The whole Number of Chances	25
B's Chance	2		
Multiplied	2		
	4	*B*'s Chance to be substracted,	4
		In favour of not losing,	21
		Chances for losing,	4
			25

Quere, Fourth, What is the Odds of losing Three to Two thrice together?

You are to add Three to Two, which makes Five, then multiply that Product by Five, which makes Twenty-five? and also multiply that Product by five, which makes One hundred and Twenty-

 five,

five, which is the whole Number of Chances: Then you are to multiply the Chances againſt you, which are Two multiplied by Two, which make Four; and that Product is to be multiplied by Two, which makes Eight; which are to be ſubſtracted from the whole Number of Chances, and that ſolves the Queſtion.

Thus, Add,	3 2		
Multiply,	5 5		
Multiply,	25 5		
	125	Whole Number of Chances,	125
Againſt you,	2 2		
Multiply,	4 2		
	8	Againſt you, ſubſtract —	8
		Chances in favour of winning, Againſt winning,	117 8
			125

By

By taking the like Method you may find out the Odds, in any greater Number of Games.

Quere, Fifth, What is the Odds of loſing Five to Three, thrice together.

Add.
5
3
———
Multiply, } 8
8
———
64
8
———
512 Whole Number of Chances, 512

Againſt you, } 3
3
———
9
3
———
multiplied 27 Againſt winning, to be ſubſtract. 27
———
In favour of not loſing, 485
Againſt winning, 27
———
512

When

When reduced it is nearly Eighteen to One.

The foregoing Rules and Examples are ſo plain, that we think it needleſs to give more Examples.

CHAP. VII.

Computations on Dice.

FIRST *Quere*, How many Chances are there upon Six Dice?

Anſwer,	on 1	on 2	on 3	on 4	on 5	on 6
Chances,	6	36	216	1296	7776	46656

The whole Number of Chances are to be found out by Multiplication, according to the following Operation.

Operation,

Operation, - - - - -	6
	6
Two Dice, - - -	36
	6
Three Dice, - - - -	216
	6
Four Dice, - - -	1296
	6
Five Dice, - - -	7776
	6
Six Dice, - - - -	46656

Thus you may proceed for any greater Number of Dice.

Second Quere, What is the Odds of throwing Six or Seven in Two Throws at Hazard with Two Dice?

Anſwer, You are to find out the whole Number of Chances, thus: multiply the higheſt Number by itſelf, *viz.* 6 by 6, which makes 36; then that Product

Product is to be multiplied by itſelf, *viz.* 36 by 36, which make 1296; being the whole Number of Chances: Then the Chances that may loſe are 25, becauſe 6 and 7 have only 11 Chances in their Favour to win, and 25 againſt them, they make 36; therefore multiply the Chances that loſe, being 25 by 25, which make 625; then ſubſtract it from the whole Number of Chances, which ſolves the Queſtion.

Thus,
```
 36
 36
---
216
108
----
1296 The whole Number of Chances,        1296
  25
  25
---
 125
 50
---
 625 The Chances that loſe are to be  }   625
         ſubſtracted,      —        — }  ----
     In favour of throwing 6 or 7 in  }   671
         Two Throws,     ——           }
     Againſt throwing 6 or 7 in Two   }   625
         Throws,      ——            — }  ----
                                         1296
```

 In

In order to prove the Operation, the Chances to win may be thus reckoned.

Viz. Multiply 11 by 11, make - -	121
Then multiply 11 by 25, make - -	275
And 25 multiplied by 11, the same, - -	275
To throw 6 or 7 in Two Throws, - -	671
Against throwing 6 or 7 in Two Throws,	625 substr.
The Difference,	46

Now in order to know how much *per Cent.* those gain who undertake to throw 6 or 7 in Two Throws at Hazard, by the Rule of Three you may find it out.

Thus, If 1296 gain 46, what will 100 gain?

Answer, 3 *l.* 11 *s.* 0 *d.* *per Cent.*

Quere, Third, In how many Throws may you undertake upon an Equality of Chance to throw Two Sixes upon Two Dice ?

Answer, The whole Number of Chances upon Two Dice are 36, out of which there is but One Chance for throwing Two Sixes ; therefore (according to Mr. *Demoivre*'s Doctrine) you are to multiply 35 by 0,7, which solves the Question.

Thus, 35
0,7
24,5 You may undertake to do it in Twenty-four Throws and a Half.

Quere, Fourth, In how many Throws with Three Dice may you undertake to throw Three Sixes ?

Answer,

Answer, The whole Number of Chances upon 2 Dice being 36, and as a Third Die is to be added, you are to multiply 36 by the higheſt Number of the Third Die, which is 6, that Product is 216, out of which there is but One Chance for throwing Three Sixes, and 215 againſt it; therefore, you are to multiply 215 by 0,7, which make 150,5, and ſhews that the Chances requiſite muſt be 150 and $\frac{1}{2}$,

Thus, 36
6

216 The whole Number of Chances, 216
The Chance to win, 1

Againſt doing it, 215
For throwing, 1

216

215
0,7

150,5 The Chances to be thrown upon an Equality.

Quere, Fifth, What is the Chance of throwing Six or Five at Hazard in Two Throws with Two Dice?

The whole Number of Chances are to be found by multiplying 36 by 36, which make 1296; then the Chances for thoſe who undertake to throw 6 or 5 in Two Throws are to be found by multiplying 27 by 27, there being ſo many Chances againſt them, which make 729, which are to be ſubſtracted from the whole Number of Chances, and there remains 567 for thoſe who undertake to throw Six or Five in Two Throws.

Thus, 36
36
1296 Whole Number of Chances, 1296

Multiply, } 27
27
729 The Chances againſt throwing Six or Five, — — } 729
The Chances for throwing, 567
The Chances againſt it, 729
1296

The

The Chances to win may be thus reckoned, multiply 9 by 9, which make 81, then multiply 9 by 27, which make 243, and then multiply 27 by 9, which make the ſame.

Thus, Nine multiplied by Nine, make - - -	81
Nine multiplied by Twenty-ſeven, make - - -	243
Twenty-ſeven multiplied by Nine, the ſame, - - -	243
	567

Againſt throwing 6 or 5 in 2 Throws.

As above, is - - -	729
For throwing, - - -	567
The Difference,	162

If you would know how much *per Cent.* is gained againſt thoſe who undertake to throw 6 or 5 in Two Throws,

Throws, with Two Dice at Hazard, it may be found out by the Rule of Three, as in a former Example.

Thus, If 1296 gain 162, what will 100 gain?

Quere, Sixth, In what Number of Throws may you undertake to throw 3 Sixes twice with 3 Dice?

The whole Number of Chances on 3 Dice, as before, is found out to be 216, out of which there is only 1 Chance for throwing 3 Sixes, and 215 againſt it; therefore, multiply 215 by 1,678, and that Product ſhews the Number, *viz.* 360 Chances nearly, according to Mr. *Demoivre*'s Doctrine.

EXAMPLE.

Thus, 1,678
215
———
8390
1678
3356
———
360,770 The Whole.

Quere, Seventh, What is the Chance of throwing an Ace in the First Throw with 4 Dice?

Answer, The whole Number of Chances upon 4 Dice are found out as before to be 1296. And to find out the Chance for throwing an Ace the First Throw with 4 Dice, you are to multiply 5 by 5, which make 25, that Product is to be multiplied by 5, which make 125 for the 3d Die; and that Product is to be multiplied by 5, which make 625 for the 4th Die; then substract 625 from the whole Number of Chances, which are 1296, it solves the Question.

Thus,

Thus, -	6
	6
Two Dice, -	36
	6
Third Die, -	216
	6
Fourth Die, -	1296 Whole Num. 1296

	5
	5
Two Dice, -	25
	5
Third Die, - -	125
	5

Fourth Die, - 625 For throwing an Ace the First Throw with 4 Dice; this is to be substracted from the Whole, } 625

Against throwing,	671
For throwing,	625
The Whole,	1296

When

When reduced, the Odds is Thirteen to Twelve nearly, for doing it.

Quere, *Eighth*, Suppoſe you undertake to throw an Ace, a Deuce, a Three, a Four, a Five, and a Six, with Six Dice, how is this to be ſolved?

Anſwer, You are to multiply the Six Numbers into one another, *viz.* 1, 2, 3, 4, 5, 6, which make 720; then find out the whole Number of Chances upon Six Dice, which are 46656, therefore the Odds will be 46656 to 720, againſt doing it; which when reduced will be Sixty-four to One nearly.

Multiply Six Numbers into one another.

Thus, 1
2
—
2
3
—
6
4
—
24
5
—
120
6
—
720 Which is to be the Divisor of the whole Number.

Dividend.

Divisor, 720 | 46656 | 64 to 1 nearly.
4320
—
3456
2880
—
576

CHAP.

CHAP. VIII.

In a Lottery to find out the Number of Tickets, which is requisite to entitle you to a Prize, upon an Equality of Chance.

LET us suppose in a Lottery where there is Twelve Blanks to One Prize?

Quere, First, How many Tickets are requisite to give you an equal Chance to get a Prize?

You are to multiply 12 by 0,7; that Product solves the Question, according to Mr. *Demoivre*.

Thus, 12
0,7
———
8,4 Nearly Eight Tickets.

Quere, Second, Suppose Ten Blanks to a Prize?

Multiply as before, 10 by 0,7.

Thus, 10
0,7
———
7,0 Seven Tickets exactly will give an equal Chance for a Prize.

Quere, Third, Suppose Twenty Blanks to a Prize?

20
0,7
———
14,0 Fourteen Tickets.

Sup-

Suppoſe in a Lottery where there is Twelve Blanks to One Prize?

Quere, Fourth, How many Tickets are requiſite to make it an equal Chance for getting Two Prizes?

You are to multiply 12 by 1,678, which ſhows it is nearly 20 Tickets.

Thus, 1,678
12

20,136 Twenty Tickets nearly.

Suppoſe a Lottery of Ten Blanks to a Prize?

Quere, Fifth, How many Tickets are requiſite to make it an equal Chance for getting Two Prizes? Multiply as before.

Thus,

Thus, 1,678
10

16,780 Seventeen Tickets nearly.

Suppose a Lottery of Twenty Blanks to a Prize?

Quere, Sixth, How many Tickets are requisite to make it an equal Chance for getting two Prizes? Multiply as before.

Thus, 1,678
20

33,560 Thirty-three and a half nearly.

C H A P. IX.

The Value of an Annuity of One Pound a Year upon a single Life, Interest of Money at 3 per Cent. *calculated according to the* London *Bills of Mortality.*

Age.	Value.			Age.	Value.			Age.	Value.		
6	18	16	0	31	14	16	0	56	10	2	0
7	18	18	0	32	14	12	0	57	9	18	0
8	19	0	0	33	14	8	0	58	9	12	0
9	19	0	0	34	14	4	0	59	9	8	0
10	19	0	0	35	14	2	0	60	9	4	0
11	19	0	0	36	13	18	0	61	8	18	0
12	18	18	0	37	13	14	0	62	8	14	0
13	18	14	0	38	13	10	0	63	8	10	0
14	18	10	0	39	13	6	0	64	8	6	0
15	18	6	0	40	13	4	0	65	8	0	0
16	18	2	0	41	13	0	0	66	7	16	0
17	17	18	0	42	12	16	0	67	7	12	0
18	17	12	0	43	12	12	0	68	7	8	0
19	17	8	0	44	12	10	0	69	7	2	0
20	17	4	0	45	12	6	0	70	6	18	0
21	17	0	0	46	12	2	0	71	6	14	0
22	16	16	0	47	11	18	0	72	6	10	0
23	16	10	0	48	11	16	0	73	6	4	0
24	16	6	0	49	11	12	0				
25	16	2	0	50	11	8	0				
26	15	18	0	51	11	4	0				
27	15	12	0	52	11	0	0				
28	15	8	0	53	10	14	0				
29	15	4	0	54	10	10	0				
30	15	0	0	55	10	6	0				

The Value of an Annuity of One Pound a Year upon a single Life, Interest of Money at 4 per Cent. *calculated according to the* London *Bills of Mortality.*

Age.	Value.			Age.	Value.			Age.	Value.		
6	16	4	0	31	12	18	0	56	9	2	0
7	16	6	0	32	12	14	0	57	8	18	0
8	16	8	0	33	12	12	0	58	8	14	0
9	16	8	0	34	12	8	0	59	8	12	0
10	16	8	0	35	12	6	0	60	8	8	0
11	16	8	0	36	12	2	0	61	8	4	0
12	16	6	0	37	11	18	0	62	8	2	0
13	16	4	0	38	11	16	0	63	7	18	0
14	16	0	0	39	11	12	0	64	7	14	0
15	15	16	0	40	11	10	0	65	7	10	0
16	15	12	0	41	11	8	0	66	7	6	0
17	15	8	0	42	11	4	0	67	7	2	0
18	15	4	0	43	11	2	0	68	6	18	0
19	15	0	0	44	11	0	0	69	6	14	0
20	14	16	0	45	10	16	0	70	6	10	0
21	14	14	0	46	10	14	0	71	6	6	0
22	14	10	0	47	10	10	0	72	6	2	0
23	14	6	0	48	10	8	0	73	5	18	0
24	14	2	0	49	10	4	0				
25	14	0	0	50	10	2	0				
26	13	16	0	51	9	18	0				
27	13	12	0	52	9	16	0				
28	13	8	0	53	9	12	0				
29	13	4	0	54	9	8	0				
30	13	2	0	55	9	6	0				

The Value of an Annuity of one Pound a Year for a single Life, Interest of Money at 3 per Cent. *calculated according to the* Breslaw *Table.*

Age.	Value.			Age.	Value.			Age.	Value.		
6	19	6	7	31	16	12	5	56	10	18	0
7	19	12	0	32	16	8	10	57	10	12	0
8	19	14	10	33	16	5	0	58	10	6	0
9	19	17	4	34	16	1	2	59	10	0	7
10	19	17	4	35	15	17	2	60	9	14	7
11	19	14	0	36	15	13	4	61	9	8	5
12	19	12	0	37	15	9	2	62	9	2	2
13	19	9	4	38	15	5	2	63	8	15	9
14	19	6	7	39	15	1	0	64	8	9	2
15	19	3	9	40	14	16	0	65	8	2	7
16	19	1	0	41	14	12	7	66	7	15	9
17	18	18	0	42	14	8	2	67	7	9	0
18	18	15	2	43	14	3	9	68	7	2	0
19	18	12	2	44	13	19	2	69	6	15	0
20	18	9	2	45	13	14	7	70	6	7	7
21	18	6	0	46	13	9	7	71	6	0	2
22	18	3	0	47	13	5	0	72	5	12	7
23	17	19	11	48	13	0	5	73	5	5	0
24	17	16	7	49	12	15	2	74	4	17	0
25	17	13	2	50	12	10	2	75	4	9	0
26	17	10	0	51	12	5	2				
27	17	6	7	52	12	0	0				
28	17	3	2	53	11	14	7				
29	16	19	7	54	11	9	2				
30	16	16	0	55	11	3	7				

The Value of an Annuity of one Pound a Year for a single Life, Interest of Money at 4 per Cent. *calculated according to the* Breslaw *Table.*

Age.	Value.			Age.	Value.			Age.	Value.		
6	16	10	0	31	14	10	10	56	10	0	5
7	16	12	0	32	14	8	2	57	9	15	4
8	16	15	7	33	14	5	4	58	9	10	5
9	16	17	9	34	14	2	5	59	9	5	4
10	16	17	9	35	13	19	7	60	9	0	2
11	16	15	7	36	13	16	5	61	8	15	0
12	16	12	10	37	13	13	5	62	8	5	7
13	16	12	0	38	13	10	5	63	8	4	0
14	16	10	0	39	13	7	2	64	7	18	5
15	16	8	2	40	13	4	0	65	7	12	7
16	16	6	2	41	13	0	5	66	7	6	7
17	16	4	2	42	12	17	0	67	7	0	5
18	16	2	0	43	12	13	7	68	6	15	0
19	15	19	9	44	12	10	0	69	6	7	9
20	15	17	9	45	12	6	5	70	6	1	2
21	15	15	7	46	12	2	5	71	5	14	5
22	15	13	5	47	11	18	10	72	5	7	7
23	15	11	0	48	11	14	10	73	5	0	5
24	15	8	7	49	11	10	10	74	4	13	4
25	15	6	2	50	11	6	10	75	4	5	9
26	15	3	9	51	11	2	7				
27	15	0	10	52	10	18	5				
28	14	18	10	53	10	14	0				
29	14	16	2	54	10	9	4				
30	14	13	4	55	10	4	10				

The present Value of one Pound to be received at the End of any Number of Years, not exceeding 60, *Discount at the Rate of* 3 per Cent. *compound Interest.*

Years.	Value.			Years.	Value.			Years.	Value,		
1	0	19	5	21	0	10	9	41	0	5	11¼
2	0	18	10½	22	0	10	5	42	0	5	9¾
3	0	18	3¼	23	0	10	0¾	43	0	5	7½
4	0	17	9	24	0	9	10	44	0	5	5½
5	0	17	3	25	0	9	6½	45	0	5	3½
6	0	16	9	26	0	9	3¼	46	0	5	0¾
7	0	16	3½	27	0	9	0	47	0	5	0
8	0	15	10	28	0	8	9	48	0	4	10½
9	0	15	4	29	0	8	6	49	0	4	8¼
10	0	14	11	30	0	8	3	50	0	4	7
11	0	14	5½	31	0	8	0	51	0	4	5¼
12	0	14	0	32	0	7	9	52	0	4	3¼
13	0	13	7½	33	0	7	6½	53	0	4	2
14	0	13	2¾	34	0	7	4	54	0	4	0½
15	0	12	10	35	0	7	1¼	55	0	3	11
16	0	12	5¾	36	0	6	11	56	0	3	10
17	0	12	2½	37	0	6	8½	57	0	3	8½
18	0	11	9	38	0	6	6	58	0	3	7½
19	0	11	5	39	0	6	2¾	59	0	3	6
20	0	11	0¾	40	0	6	0	60	0	3	4¾

The present Value of one Pound to be received at the End of any Number of Years, not exceeding 60; *Discount at* 4 per Cent. *compound Interest.*

Years.	Value.			Years.	Value.			Years.	Value.		
1	0	19	3	21	0	8	9½	41	0	4	0
2	0	18	6	22	0	8	5½	42	0	3	10½
3	0	17	10	23	0	8	1	43	0	3	8½
4	0	17	1	24	0	7	10	44	0	3	7
5	0	16	5¼	25	0	7	6	45	0	3	5¼
6	0	15	10	26	0	7	2½	46	0	3	3½
7	0	15	2¼	27	0	6	11	47	0	3	2
8	0	14	7½	28	0	6	8	48	0	3	0½
9	0	14	0½	29	0	6	5	49	0	2	11
10	0	13	6	30	0	6	2	50	0	2	10
11	0	13	0	31	0	5	11	51	0	2	8½
12	0	12	6	32	0	5	8½	52	0	2	7½
13	0	12	0	33	0	5	6	53	0	2	6
14	0	11	6½	34	0	5	3	54	0	2	5
15	0	11	1	35	0	5	1	55	0	2	3¼
16	0	10	8	36	0	4	10½	56	0	2	2¾
17	0	10	3¼	37	0	4	8½	57	0	2	1½
18	0	9	10½	38	0	4	6	58	0	2	0¾
19	0	9	6	39	0	4	4	59	0	1	11
20	0	9	1½	40	0	4	2	60	0	1	10¾

The present Value of one Pound à Year for any Number of Years, not exceeding 60, *Interest of Money at* 3 per Cent.

Years.	Value.			Years.	Value.			Years.	Value.		
1	0	19	5	21	15	8	3¾	41	23	8	3
2	1	18	3¼	22	15	18	9½	42	23	14	0
3	2	16	7	23	16	8	11	43	23	19	8
4	3	14	4¼	24	16	18	9	44	24	5	1
5	4	11	7½	25	17	8	3¼	45	24	10	5
6	5	9	11½	26	17	17	6½	46	24	15	6
7	6	4	7½	27	18	6	6½	47	25	0	6
8	7	0	5	28	18	15	3½	48	25	5	4
9	7	15	9	29	19	3	9	49	25	10	0½
10	8	10	7½	30	19	12	0	50	25	14	7½
11	9	5	0¾	31	20	0	0	51	25	19	0
12	9	19	1	32	20	7	10	52	26	3	4
13	10	12	8½	33	20	15	4	53	26	7	6
14	11	5	11	34	21	2	8	54	26	11	7
15	11	18	9	35	21	9	9	55	26	15	3½
16	12	11	2¾	36	21	16	8	56	26	19	4
17	13	3	4	37	22	3	4	57	27	3	0
18	13	15	0¾	38	22	9	10½	58	27	6	7½
19	14	6	6	39	22	16	2	59	27	10	1½
20	14	17	6½	40	23	2	4	60	27	13	4

The present Value of one Pound a Year for any Number of Years, not exceeding 60, *Interest of Money at* 4 per Cent.

Years.	Value.	Years.	Value.	Years.	Value.
1	0 19 2¾	21	14 0 7½	41	19 19 10½
2	1 17 9	22	14 9 0¼	42	20 3 8¾
3	2 15 6¼	23	14 17 4½	43	20 7 5
4	3 12 7¼	24	15 4 11	44	20 10 11
5	4 9 0¼	25	15 12 5	45	20 14 5
6	5 4 10½	26	15 19 8	46	20 17 8½
7	6 0 0	27	16 6 7½	47	21 0 10¾
8	6 14 8	28	16 13 3¼	48	21 3 11
9	7 8 8½	29	16 19 8¼	49	21 6 10
10	8 2 2½	30	17 5 10½	50	21 9 8
11	8 15 2½	31	17 11 9½	51	21 13 5¼
12	9 7 8½	32	17 17 5¾	52	21 14 11½
13	9 19 8½	33	18 2 11¾	53	21 17 5½
14	10 11 3¼	34	18 8 2¾	54	21 19 10¼
15	11 2 4½	35	18 13 3½	55	22 2 9
16	11 13 0½	36	18 18 0	56	22 4 4¾
17	12 3 3½	37	19 2 10¼	57	22 6 6½
18	12 13 2¼	38	19 7 4¼	58	22 8 7¼
19	13 2 8¼	39	19 11 8½	59	22 10 7
20	13 11 10	40	19 15 10½	60	22 12 5¾

The BRESLAW TABLE.

Ages	Persons living.	Ages	Persons living.	Ages	Persons living.
1	1000	29	539	57	272
2	855	30	531	58	262
3	798	31	523	59	252
4	760	32	515	60	242
5	732	33	507	61	232
6	710	34	499	62	222
7	692	35	490	63	212
8	680	36	481	64	202
9	670	37	472	65	192
10	661	38	463	66	182
11	653	39	454	67	172
12	646	40	445	68	162
13	640	41	436	69	152
14	634	42	427	70	142
15	628	43	417	71	131
16	622	44	407	72	120
17	616	45	397	73	109
18	610	46	387	74	98
19	604	47	377	75	88
20	598	48	367	76	78
21	592	49	357	77	68
22	586	50	346	78	58
23	579	51	335	79	49
24	573	52	324	80	41
25	567	53	313	81	34
26	560	54	302	82	28
27	553	55	292	83	23
28	546	56	282	84	20

Dr. *Halley*, Profeſſor of Geometry in the Univerſity of *Oxford*, hath framed the foregoing Table, from Tables of Births and Burials that were in *Breſlaw*, the capital City of the Province of *Sileſia* in *Germany*, for five Years, *viz.* from 1687 to 1691 incluſive, drawn up Monthly by one Dr. *Newman* of that City, and communicated to the Royal Society here: This Table ſhews the Number of Perſons that were living in their reſpective Ages current.

Some Uſes which may be made of this Table.

Suppoſe it was required to know the Odds of a Man of 25 Years of Age, dies within a Year?

Look in the Table and you will find in the Column againſt 25, that there is alive 567; in the following Year, *viz.* 26, there is only 560 living; therefore it

it is 560 to 7, that a Perſon of 25 Years of Age lives One Year. Or when reduced, 80 to 1.

If you would know the Odds of a Man of 40 living 7 Years, you will find the Number of Perſons alive at 47 in the Table to be 377, which are to be ſubſtracted from the Number of Perſons alive at 40 Years of Age, which are 445 ; the Difference being 68, ſhews that the Perſon's dying in 7 Years, to be 68 ; therefore it is 377 to 68, or nearly 5 and a Half to 1, that a Man of 40 lives 7 Years.

If you would know how many Years a Man of 40 has an equal Chance to live, look in the Table againſt 40, and you will find alive then 445 ; then look in the Table till you come to Half that Number, *viz* 222. which ſhews that it is nearly an equal Wager that a Man of 40 Years of Age lives 22 Years.

F I N I S.